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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,718	07/20/2005	James Timothy Cronin	CH2883USPCT	2991

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EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	**PAPER NUMBER**
1754	

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/539,718	CRONIN ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, step a), it is required that the crude titanium tetrachloride chlorinator discharge is mixed with a vanadium passivating agent and an aluminum passivating agent. However, in the proviso (i) when, after mixing the vanadium passivating agent into the chlorinator discharge, titanium oxychloride is formed in the discharge, no aluminum passivating agent is mixed into the discharge; therefore, it is unclear whether the aluminum passivating agent is positively required to be mixed with the discharge.

Also, for the proviso (i) and (ii), the presence of titanium oxychloride in the discharge is determined after mixing the vanadium passivating agent into the chlorinator discharge, it is unclear how the aluminum passivating agent can be added simultaneously or before the vanadium passivating agent is mixed into the discharge and still satisfy the proviso because in this case, at the time of adding aluminum passivating agent, the vanadium passivating agent has not yet or just been added so the presence of titanium oxychloride in the discharge could not be determined.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson (4,246,022) or GB 744,074, either one in view of Cronin (2001/0016182).

Robinson '022 discloses that it is known in the art to purify a titanium tetrachloride by treatment with mineral oil, and a mineral oil sludge residue often containing aluminum chloride, niobium chloride and vanadium chloride thereby being produced (note column 1, lines 32-43). Thus, Robinson '022 fairly teaches the use of mineral oil would remove both aluminum and vanadium impurities from titanium tetrachloride and the disclosure of "mineral oil sludge residue" fairly suggests a separation step. It would have been obvious to one skill in the art to use any known and conventional method in the art to separate the purified titanium tetrachloride from the mineral oil sludge.

Alternatively, GB '074 discloses a process for purifying crude titanium chloride to remove a major portion of the impurities therefrom which comprises refluxing the crude titanium tetrachloride in the presence of animal waxes (note claim 1). The impurities in the crude titanium tetrachloride include, for example, vanadium, silica, aluminum, niobium and tungsten (note page 2, lines 25-29).

For the use a particular oil or animal fat, it would have been obvious to one of ordinary skill in the art to select a known and conventional oil or animal fat in the art to effectively remove the impurities, especially vanadium and/or aluminum from titanium tetrachloride through routine experimentation.

The difference is Robinson '022 or GB '074 does not disclose the step of adding aluminum passivating agent which is selected from the group consisting of water, water containing solutions, water containing mixtures, and carboxylic acids.

Cronin '182 discloses an in-process, real-time control loop capable of controlling the passivation of aluminum chloride formed in the chlorination of titanium-containing ores by monitoring titanium oxychloride present in passivated crude titanium tetrachloride comprising the steps: (a) rapidly mixing into a chlorinator discharge stream, where the stream comprises predominately vapor in the presence of liquid mist and solids, an aluminum chloride-passivating agent to form in the process stream an essentially non-corrosive aluminum containing compound, and titanium oxychloride; (b) measuring in-process the concentration of titanium oxychloride in the chlorinator discharge stream or in the crude titanium tetrachloride; (c) comparing the measured concentration of titanium oxychloride to that of an aim point concentration of titanium oxychloride; and (d) adjusting the rate of addition of the aluminum chloride-passivating agent to restore or maintain the concentration of titanium oxychloride at the aim point (note claim 1).

Cronin '182 teaches that aluminum chloride present in the crude titanium tetrachloride is a highly corrosive material. It both quickly and severely attacks the

metal materials of construction in the purification systems (note paragraph [0002]). The real-time control loop combined with the location of the addition of the passivating agent minimizes both the losses of titanium value from titanium tetrachloride reaction with excess concentrations of passivating agent and losses of service time from corrosion equipment and the formation of unwanted deposits (note paragraph [0039]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to remove aluminum chloride impurity from Robinson '022 or GB '074 by using the process of Cronin '182 in order to minimize both the losses of titanium and losses of service time from corrosion equipment. It would have been obvious to one skilled in the art to carry out the process of Cronin '182 before, after or during the process of Robinson '022 or GB '074, as long as the advantages as stated above can be achieved.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kay et al (2,600,881) in view of Frey et al (2,592,021) and Cronin '182.

Kay '881 discloses a process for the removal of aluminum chloride in solution with liquid titanium tetrachloride which comprises mixing with said liquid an amount of water sufficient only to react with the active aluminum chloride to be removed therefrom, and then separating the titanium tetrachloride from the resulting aluminum fluoride complex (note claim 1) by distillation (note claim 2).

Kay '881 teaches that the use of excess water is undesirable because loss of titanium values will occur due to formation of titanium oxychloride and the like (note

column 5, lines 31-36). Kay '881 further teaches that beside the aluminum chloride impurity, the titanium tetrachloride contains other impurities such as vanadium (note table in column 6 and Example I). After the aluminum chloride is removed, the titanium tetrachloride is subjected to another purification step to remove color-imparting impurities such as a chloride of vanadium (note column 6, lines 30-35).

The difference is Kay '881 does not disclose the use of an oil or animal fat to remove vanadium and the step of monitoring the presence of titanium oxychloride in order to decide the addition of the aluminum passivating agent.

Frey '021 discloses a process for removing coloring impurities from titanium tetrachloride comprises intermixing said chloride and a small proportion of an organic compound selected from the group consisting of hydrocarbons and compounds of carbon, hydrogen and at least one substituent from the group consisting of hydroxyl, oxy, keto, amino, and carboxyl radicals, heating said organic compound in the titanium tetrachloride to cause said compound to carbonizes therein and said impurities are taken up by said carbonization product, and separating purified titanium tetrachloride from said carbonization product holding said impurities (note claim 1 and Example 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further remove the vanadium impurity from the titanium tetrachloride of Kay '881 by using a known and conventional process as suggested by Frey '021 because such process provides an easy and cheap way of removing vanadium impurity from titanium tetrachloride (note Frey '021, column 2, lines 5-17).

Cronin '182 is applied as stated above to teach the in-process, real time control loop for the process of removing aluminum chloride from titanium tetrachloride to prevent the losses of titanium and the losses of service time from corrosion of equipment and the formation of unwanted deposits.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman can be reached on (571) 272-1358. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 or (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
March 20, 2006